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# Wind Shear Program in France

MEGASODAR Experiment

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# SODAR APPLICATION TO WIND SHEAR AND WAKE VORTEX DETECTION

A preliminary experiment supported by the French Civil Aviation has proven that wind measurement at low elevation angles using acoustic remote sensing was feasible. This experiment was conducted using a 2.4 meters parabolic dish antenna with about 2 watt of acoustic power emitted at 4000 Hz. The elevation angle was of 6 degrees.

However a reflector type antenna does not allow the antenna pattern optimisation that can be achieved on phased array type antennas. Moreover arraying elements increases the emitted power.

Remtech has recently developped a commercial phased array Sodar line. A 2 meters by 2 meters 432 elements commercial phased array system was operated at Roissy International Airport for a few days. You will find some radial wind data at the end of this document. Eventhough this system was not optimized for such application it showed ranges of about 800 meters for an averaging time of 10 minutes and an elevation angle of 20 degrees. Some strong echo regions are present in the data and seem to be related to wake vortex.

Further developments starting before the end of this year include :

- installation of an optimized phased array system at Roissy International Airport.

- gathering data for wake vortex study

- generalization of the signal coding techniques to reduce the acquisition time to a few minutes.

- beam steering with simultaneous measurement on 4 beams.

The study will allow the definition of the technical specifications of a system for wind shear and wake vortex detection having a range of at least two miles.

## Wind Shear Program in France - Questions and Answers

Q: ERIC PALMER (McDonnell Douglas, Long Beach) - Has the DGAC/JAA a plan to require airborne wind shear systems? If so, what will be required and when?

A: BERNARD ADES (DGAC) - There is no requirement on the operational side yet; still waiting for more information on the phenomenon (characteristics in France and Europe). If a requirement is made, it shall be made in conjunction, in coordination, within a European Joint Airworthiness Authority rather than DGAC alone. Furthermore this would be made within the regular consultation, JAA/FAA consulting process.

Q: MARILYN WILSON (MIT Lincoln Laboratory) - Is wind shear a major hazard in France? Is it common?

A: BERNARD ADES (DGAC) - Not really. We've asked for a meteorological study to characterize the phenomenon in France. Unfortunately it has been very difficult to get data from the airport so what we've begun to do is to collect data from the nuclear centers where there is a strict follow up of the meteorological conditions. But yet we have no result from this study. We have very particular cases where kinds of wind shears were recorded in France, particularly south of France around Nice Airport, but it is something very rare. You see the problem is that our planes are still flying to other parts of Europe and also to the US.

# Session II. Case Study